SPECS OR REFERENCE

1. Minimum section required by Subdivision Regulations

6" Item 304 ⇒ 6(0.14) = 0.84
4" Item 301 ⇒ 4(0.35) = 1.40
1½" Item 448 ⇒ 1.5(0.35) = 0.52

Total SN = 2.76

2. Equivalent full depth asphalt section

$\frac{2.76}{0.35} = 7.88'' \approx 8''$

Use 6" Item 301 and 2" Item 448

Date 7-24-07
By JEU
Approved By

Full Depth Asphalt Pavement Substitution

Job No. N/A
Sheet 1 of 1

SPECS OR REFERENCE	
ODOT Pavement Design & Rehabilitation Manual	Number of Lanes: 2 Functional Classification: Urban Local 2001 Traffic: 1000 ADT (Assumed) 2011 Traffic: 1000 ADT (Assumed No Increase) 24 Hour Truck %: 2% (Assumed) Soil Classification: Average values from the 4 borings taken: Liquid Limit: 29; Plasticity Index: 7; % Passing #200 sieve = 74.6 Note: Soil classification data given in Soil Testing Report prepared by North Central Engineering dated 9-6-01. 1. Determine the Group Index Number (G.I.) using figure 203-2 (Copy Included) Partial Group Index No. = 7.9 (From Chart A) Partial Group Index No. = 0.8 (From Chart B) Total = 8.7 ⇒ Use 9 G.I. No. 2. Determine the CBR value using figure 203-3 (Copy Included) CBR = 6 $M_R = 1200 \times 6 = 7200$ psi 3. Determine the 18 Kip Equivalent Single Axle Loading (ESAL) Using figure 202-1, the following data is determined: Directional Distribution D = 50% B Factor = 0.94 Lane Factor = 1.0 C Factor = 0.43 B:C Ratio = 1:2

SPECS OR REFERENCE	

ESAL's from B trucks $1000(.02).5(1.0)(1/5)0.94 = 1.88$

ESAL's from C trucks $1000(.02).5(1.0)(2/5)0.43 = 1.72$

Total = 3.60

Design Period ESAL's = $3.6(365.25 \frac{\text{days}}{\text{year}})$ 20 years
$= 26298 = 0.03 \times 10^6$ ESAL

4. Determine the Design Structural Number SN using figures 201-1, 402-2 and 402-3 (Copies included)

Reliability = 80% (Figure 201-1)
Overall Standard Deviation = 0.49 (Figure 201-1)
ESAL = 0.03×10^6 (From step 3)
Resilient Modulus = 7200 psi (From step 2)
Serviceability Factor = 2.0 (Figure 201-1)

Using figures 402-2 and 402-3, arrive at a structural number of approximately 2.1

5. Minimum pavement section required is as follows:

6" 304	⇒	6(0.14) =	0.84
4" 301	⇒	4(0.35) =	1.40
1½" 404	⇒	1.5(0.35) =	0.52
		Total SN =	2.76

The minimum pavement section required by the Stark County Subdivision Regulations is acceptable for use on this project.

Date 10-9-01
By JEU
Approved By

Saint James Place No. 7
Pavement Design Calculations
Job No. N/A Sheet 2 of 2

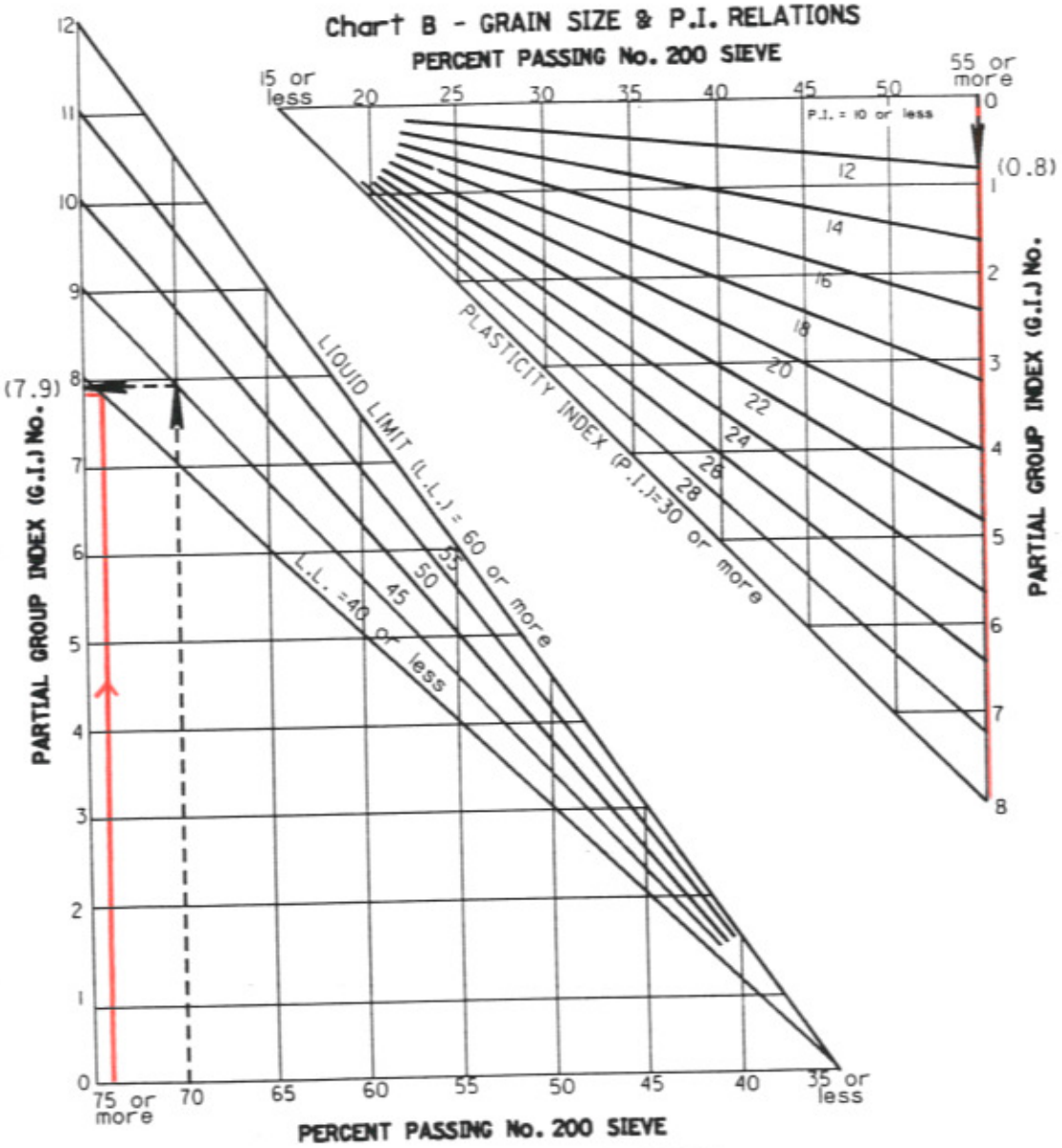
GROUP INDEX CHARTS

203-2

January 1999

Ref. Section & Figures

203.3, 302-1, 402-1



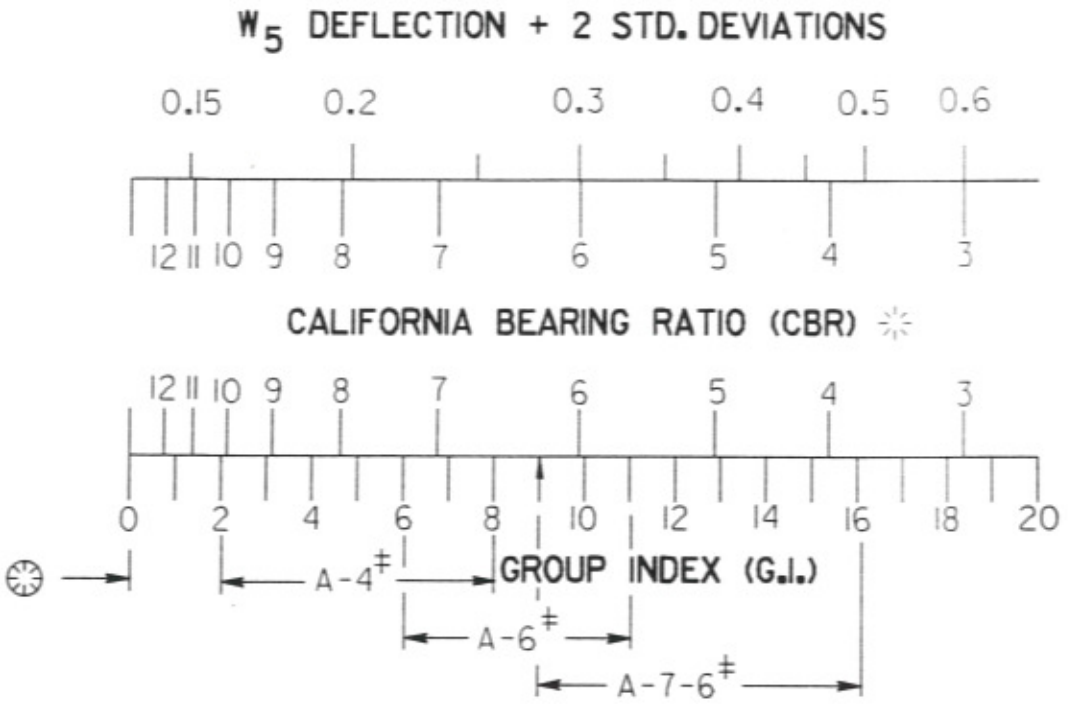
GROUP INDEX EQUALS SUM OF READINGS ON BOTH VERTICAL SCALES

Example: The G.I. of soil having 70% of its particles passing a No.200 sieve, with a L.L.=45 and a P.I.=12.

Chart A=7.9; Chart B=0.8

G.I. = 7.9+0.8 = 8.7 (rounded off to 9).

SUBGRADE RESILIENT MODULUS	203-3 January 1999 Ref. Section & Figures 203.1, 302-1, 402-1



⊛ AASHTO Classes A-1, A-2 & A-3. K=200+.

‡ Usual range of AASHTO Classes.

✳ 5-1/2 LB. hammer, 12" drop, 4 layers, 45 blows per layer, compacted at optimum moisture as determined by AASHTO T-99.

Example: G.I.=9 (Figure 203-2) CBR=6 (Rounded, from above)

RESILIENT MODULUS (M_R) = 1200 x CBR

M_R = 1200 x 6 = 7200 psi

Traffic Factors

202-1
January 1999

Reference Section
202

RATIO OF B:C COMMERCIAL VEHICLES

FUNCTIONAL CLASSIFICATION	B:C RATIO
Rural Interstate	5:1
Rural Principal Arterial	4:1
All Other Rural	2:1
Urban Interstate, Urban Freeway & Expressway, & Urban Principal Arterial	2:1
All Other Urban	1:2

ESAL CONVERSION FACTORS

FUNCTIONAL CLASSIFICATION	RIGID		FLEXIBLE	
	B	C	B	C
Rural Interstate	1.84	0.53	1.18	0.40
Rural Principal Arterial	2.36	1.02	1.51	0.66
Rural Minor Arterial (All Others)	1.45	1.59	0.91	0.98
Urban Interstate	2.22	0.78	1.41	0.56
Urban Expressway & Freeway	1.35	0.65	0.78	0.48
Urban Principal Arterial (All Others)	1.60	0.71	0.94	0.43

LANE FACTORS

Number of Lanes	% Trucks in Design Lane	Directional Distribution (%)
2 - Lane	100	50
4 - Lane	90	50
6 (or more) - Lane	80	50

Serviceability & Reliability

201-1
January 1999

Reference Section
201 & 204

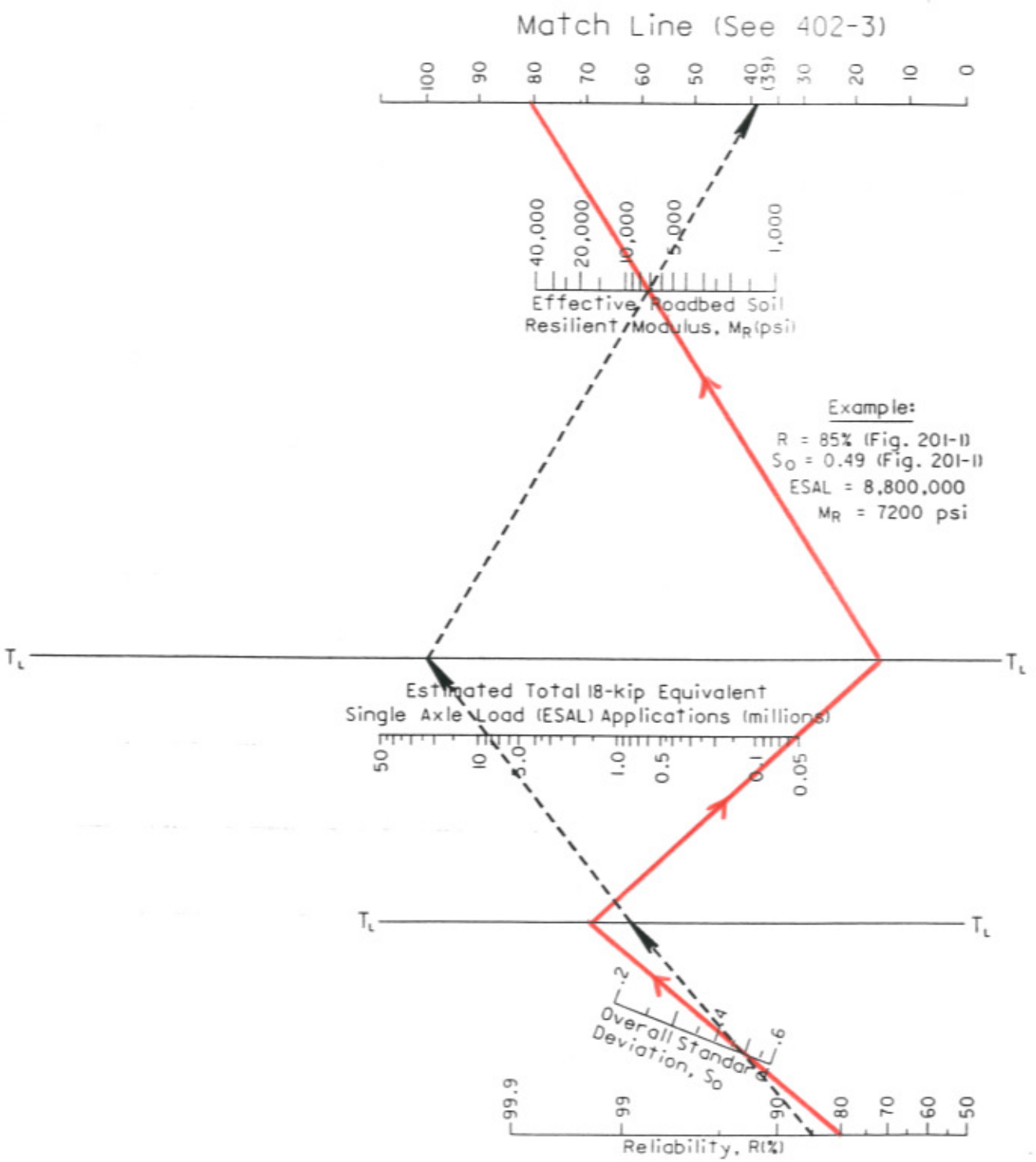
SERVICEABILITY FACTORS		
	RIGID / COMPOSITE	**FLEXIBLE**
Initial Serviceability	4.2	4.5
Terminal Serviceability	2.5	2.5
Design Serviceability Loss	**1.7**	**2.0**

RELIABILITY LEVELS (%)		
FUNCTIONAL CLASSIFICATION	URBAN	RURAL
Interstate and Freeway	95	90
Principle Arterial, Minor Arterial	90	85
Collectors	90	85
Local	80	80

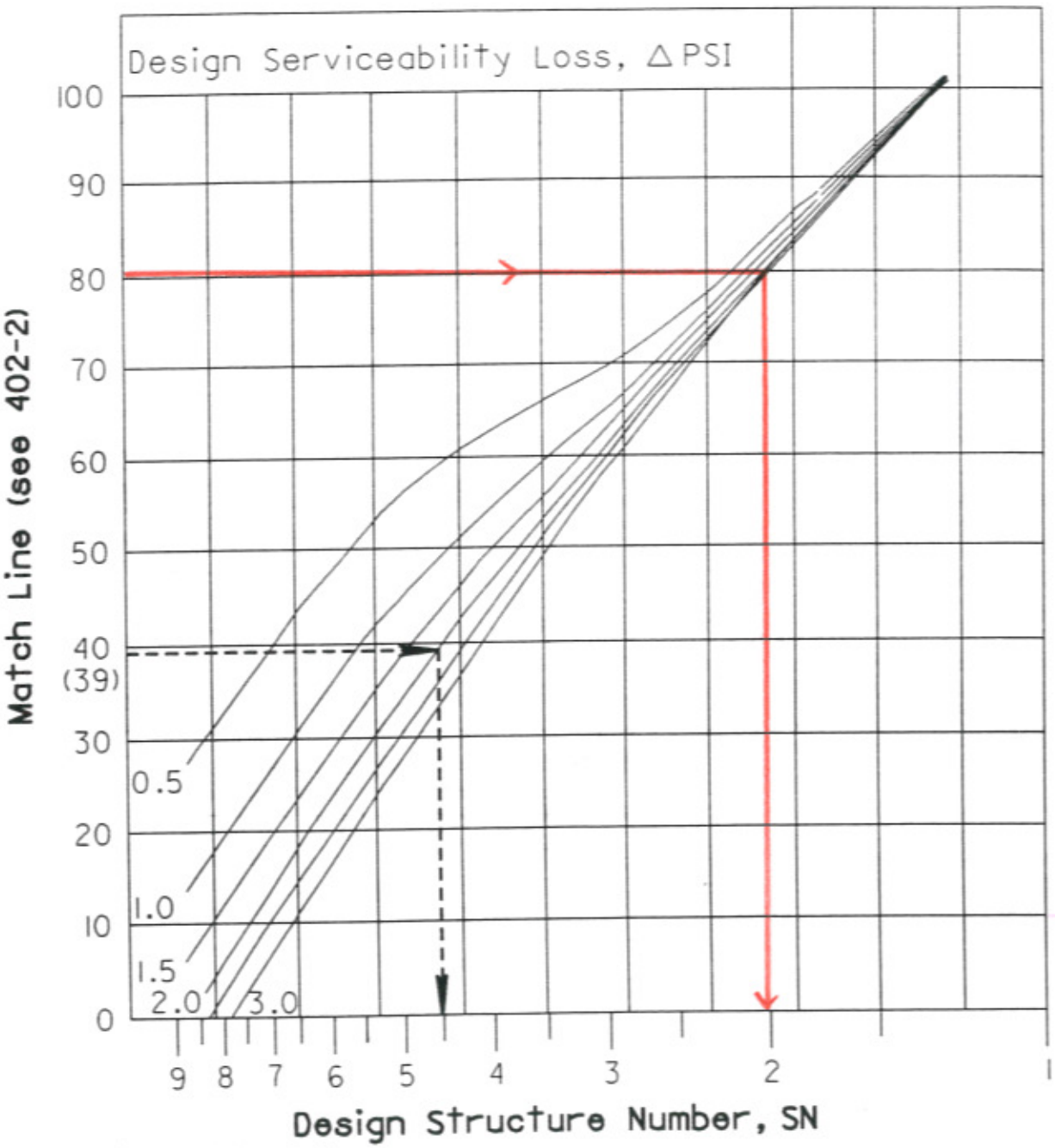
OVERALL STANDARD DEVIATION	
Flexible Pavement	0.49
Rigid Pavement	0.39

FLEXIBLE PAVEMENT DESIGN CHART SEGMENT 1

402-2
January 1999
Ref. Section & Figure
402, 402-1 (step 4)



FLEXIBLE PAVEMENT DESIGN CHART SEGMENT 2	402-3 January 1999 Ref. Section & Figure 402, 402-1 (step 4)



Example: ΔPSI = 2.0

Solution: SN = 4.5